

## What Is Claimed Is

- [c1] 1. A method for determining a shorted thyristor cell in a bridge that supplies a load from a source, the bridge including a plurality of the thyristor cells, the method including:
- sequentially gating each of the cells to a conducting state, so that only one cell is gated at one time;
- providing at least one current transformer in the bridge;
- generating a current flow that passes through the bridge including the one cell that is gated;
- observing current in the at least one current transformer to determine a short in one of the cells the that is not gated; and
- determining a shorted cell based on the step of observing current in the at least one current transformer.
- [c2] 2. The method of claim 1, wherein the at least one current transformer is placed on incoming lines to the bridge.
- [c3] 3. The method of claim 1, wherein the bridge supplies the load to a motor.
- [c4] 4. The method of claim 1, wherein the bridge further includes a shunt, the shunt having a shunt current signal value.
- [c5] 5. The method of claim 4, wherein the current flow that is generated is below the shunt current signal value.
- [c6] 6. The method of claim 4, further including the step of rectifying and scaling a current flow of the at least one current transformer that passes through the bridge, so that a signal level of the current flow that passes through the bridge is substantially that same as that of the shunt current signal value under non-shortened cell conditions.
- [c7] 7. The method of claim 1, wherein the method further includes the step of:
- providing a shunt in the bridge; and
- the step of determining a shorted cell is performed based on the observing current in the at least one current transformer and by observing current in the shunt to be above a threshold level.

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- [c8] 8. The method of claim 1, wherein the step of determining a shorted cell is performed based on the observing current in the at least one current transformer and observing the bridge voltage to be above a threshold level.
- [c9] 9. The method of claim 8, wherein the bridge supplies the load to a motor.
- [c10] 10. The method of claim 1, where in the step of observing current in the at least one current transformer to determine a short in one of the cells that is not gated includes using a look-up table to correlate which cell is tested based on which cell is gated.
- [c11] 11. The method of claim 1, wherein the thyristor cell is a silicon controlled rectifier (SCR) cell.
- [c12] 12. The method of claim 1, wherein the source is a single phase source.
- [c13] 13. The method of claim 12, wherein the at least one current transformer is one current transformer.
- [c14] 14. The method of claim 1, wherein the source is a three phase source, and wherein the at least one current transformer is two current transformers.
- [c15] 15. A method for determining a shorted thyristor cell in a bridge that supplies a load from a source, the bridge including a plurality of the thyristor cells, the method including:  
 sequentially gating each of the cells to a conducting state, so that only one cell is gated at one time;  
 providing at least one current transformer in the bridge, the at least one current transformer being placed on incoming lines to the bridge, the bridge supplying the load to a motor;  
 generating a current flow that passes through the bridge including the one cell that is gated, and wherein the bridge further includes a shunt, the shunt having a shunt current signal value, and wherein the current flow that is generated is below the shunt current signal value;  
 observing current in the at least one current transformer to determine a short in one of the cells the that is not gated; and

determining a shorted cell based on the step of observing current in the at least one current transformer.

- [c16] 16. The method of claim 15, wherein the thyristor cell is a silicon controlled rectifier (SCR) cell.
- [c17] 17. The method of claim 15, wherein the source is a single phase source.
- [c18] 18. The method of claim 17, wherein the at least one current transformer is one current transformer.
- [c19] 19. The method of claim 15, further including the step of rectifying and scaling a current flow of the at least one current transformer that passes through the bridge, so that a signal level of the current flow that passes through the bridge is substantially the same as that of the shunt current signal value under non-shortened cell conditions.
- [c20] 20. The method of claim 15, wherein the step of determining a shorted cell is performed based on the observing current in the at least one current transformer and by observing the bridge voltage to be above a threshold level.

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